

**CHILACIS TYPHAE (HETEROPTERA: LYGAEIDAE) AND THE
SUBFAMILY ARTHENEINAE NEW TO NORTH AMERICA**

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Abstract.—*Chilacis typhae* (Perris), an Old World lygaeid restricted to cattails (*Typha* spp.), is reported new to the Western Hemisphere based on collections from Delaware (1 county), Maryland (3), New York (3), and Pennsylvania (25). The known Nearctic distribution is mapped, notes on seasonal history and habits in Pennsylvania are given, and morphological characters facilitating recognition of this immigrant heteropteran are provided.

Chilacis typhae (Perris) is an Old World artheneine lygaeid occurring throughout England but uncommon in Wales and Ireland (Southwood and Leston, 1959). On the Continent it ranges from France east to Bulgaria, Rumania, and the European U.S.S.R., including Caucasus to the south, and north to Scandinavia; in Asia it has been recorded from Jordan (Slater, 1964). As the specific name implies, *C. typhae* is a specialist on plants of the genus *Typha* (Typhaceae), particularly common cattail, *T. latifolia* L. (called reedmace or bulrush in Britain). Jordan (1935) and Cobben (1953) discussed the habits of this seed-feeding bug; see Slater (1964) for additional references to papers containing biological information on *C. typhae*.

The discovery of this lygaeid in Pennsylvania and its subsequent collection in Delaware, Maryland, and New York represent the first Nearctic records for the species. The only other artheneine known from the New World is *Polychisme ferruginosus* (Stål). This Neotropical bug, recorded from Colombia and Venezuela, was recently removed from the Ischnorhynchinae and transferred to the Artheneinae, thus providing the first West-

ern Hemisphere record and making the subfamily known from all major zoogeographic areas except the Nearctic (Slater and Brailovsky, 1986).

Here, we give collection data and map the known North American distribution of *C. typhae*; give notes on its seasonal history, relative abundance, and habits on cattail in Pennsylvania; and list adult and nymphal characters that allow recognition of this adventive lygaeid in the Nearctic fauna.

North American distribution.—The first known collection of *C. typhae* in the New World was made on 4 June 1986 (by JEF) near Lickdale, Pennsylvania. Further collecting showed that this species is well established in eastern Pennsylvania (but apparently scarce in the western counties) and present in southern and central New York and northern Delaware and Maryland. We did not encounter *C. typhae* during limited collecting in Ohio, western New York, and in more southern areas of Maryland (Fig. 1), or in Indiana or Virginia (negative sites not shown in Fig. 1). The following records are available for *C. typhae* in eastern United States. All collections were made in 1986 from *Typha latifolia*; voucher specimens

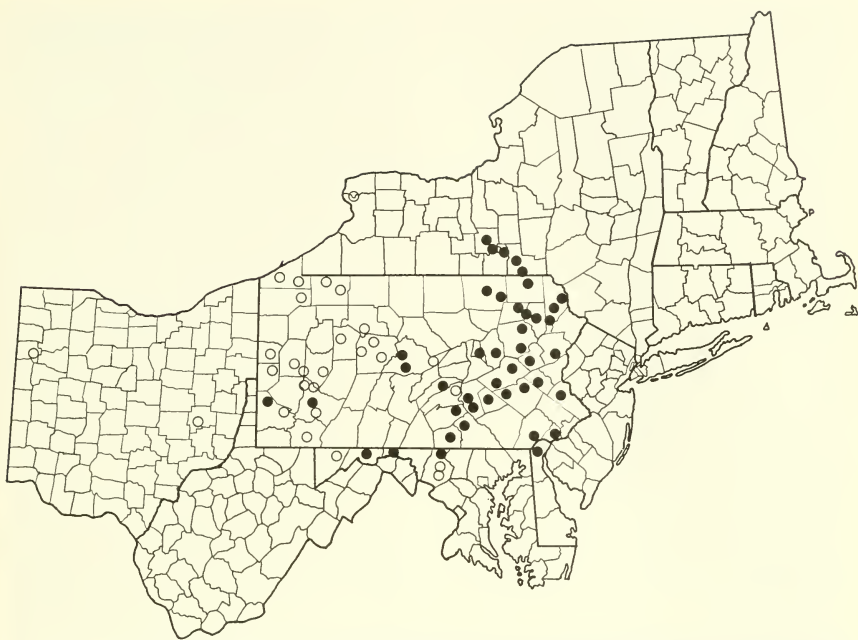


Fig. 1. Map of the Middle Atlantic and New England States showing known distribution of *Chilacis typhae* in North America. Closed circles represent 1986 collection sites; open circles, sites where cattail heads did not yield *C. typhae*.

have been deposited in the insect collections of Cornell University, Pennsylvania Department of Agriculture, U.S. National Museum of Natural History, and University of Connecticut.

DELAWARE: *New Castle Co.*, e. of Newark, 5 Nov., F. G. Stearns. **MARYLAND:** *Allegany Co.*, nr. Flintstone, 30 July, A. G. Wheeler, Jr.; *Frederick Co.*, Emmitsburg, 18 June, AGW; *Washington Co.*, nr. Hancock, 30 July, AGW. **NEW YORK:** *Broome Co.*, s. of Kirkwood and nr. Castle Creek, 26 June, AGW; *Tioga Co.*, e. of Caroline Center, 26 June, AGW; *Tompkins Co.*, Besemer, 26 June and s. of Ithaca, 29 June, AGW; Town of Ulysses, 9 mi. n. of Ithaca, 7 July, E. R. Hoebeke. **PENNSYLVANIA:** *Adams Co.*, s. of East Berlin, 16 June, AGW

and nr. Gettysburg and Hunterstown, 18 June, AGW; *Berks Co.*, nr. Frystown and Rehrersburg, 17 June, AGW and nr. Hamburg, 24 June, J. F. Stimmel; *Bradford Co.*, Towanda, 7 Aug. AGW and n. of Stevensville, 7 Aug., R. J. Gallagher; *Bucks Co.*, s. of Quakertown, 24 June, J. F. Stimmel; *Carbon Co.*, Nesquehoning, 3 July, AGW; *Centre Co.*, I-80 e. of Clearfield Co. line nr. Lanse, 10 June, AGW and nr. Martha Furnace, 20 July, JEF; *Chester Co.*, Longwood Gardens, 5 Nov., F. G. Stearns; *Columbia Co.*, e. of Bloomsburg, 5 Aug. and 29 Oct., AGW; *Cumberland Co.*, nr. Wertzville, 16 June, AGW; *Dauphin Co.*, nr. Harrisburg Area Community College, 9 June, AGW and Dauphin, 12 June, JEF; *Delaware Co.*, Media, 5 Nov., F. G. Stearns; *Juniata Co.*, nr.

Port Royal, 12 June, JEF; *Lackawanna Co.*, nr. Clarks Summit, 24 June, R. J. Gallagher and e. of Factoryville, 26 June, AGW; *Lebanon Co.*, I-81 at Exit 30, w. of Lickdale, 4 June and Rts. 22 and 934, nr. Harper Tavern, 11 June, JEF; e. of Fredericksburg, 17 June, AGW; *Lehigh Co.*, e. of Fogelsville, 3 July, AGW; *Luzerne Co.*, Frances Slocum St. Pk., 24 June, R. J. Gallagher and I-80 at junc. Rt. 309, nr. Freeland, 26 June, AGW; *Monroe Co.*, Sciota, 3 July, AGW; *Montour Co.*, n. of Danville, 5 Aug., AGW; *Schuylkill Co.*, I-81 at junc. Rt. 125, nr. Ravine, 6 June and Barnesville, 3 July, AGW; *Susquehanna Co.*, Great Bend, 26 June, AGW; *Washington Co.*, nr. Bulger, 17 June, L. L. Garrett; *Wayne Co.*, Beach Lake and s. of Hoadleys, 19 June, K. Valley; *Westmoreland Co.*, Delmont, 2 Dec., L. L. Garrett; *Wyoming Co.*, Overfield Twp. n.e. of L. Winola, 24 June, R. J. Gallagher and e. of Dixon, 26 June, AGW; *York Co.*, s.w. of Kralltown, 16 June and s. of Dillsburg, 18 June, AGW.

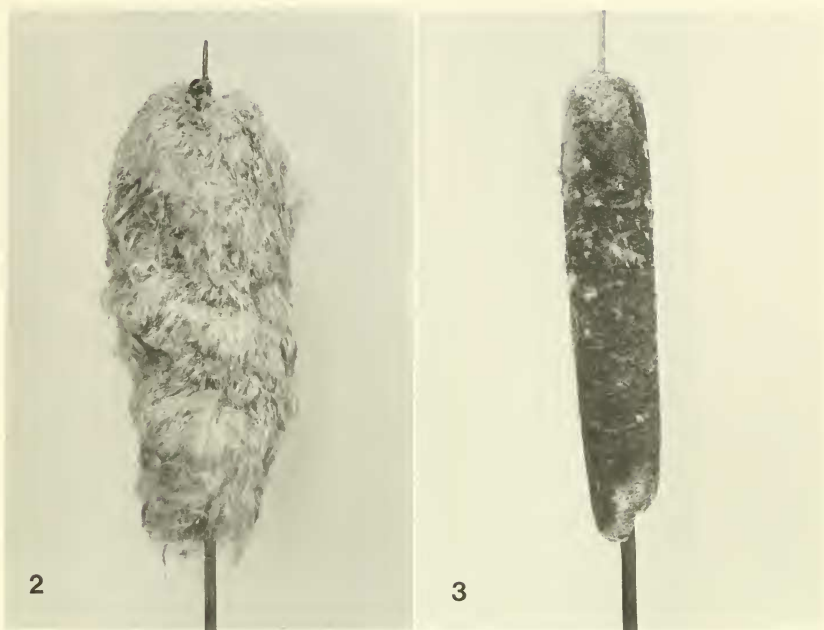
Chilacis typhae appears to be a relatively recent introduction in North America, even though its principal host, *Typha latifolia*, is naturally Holarctic (Gleason and Cronquist, 1963; Everett, 1982). The tribe to which *C. typhae* belongs, Artheneini, is considered a Palearctic element (Slater, 1964; Slater and Brailovsky, 1986). Claassen (1921) collected the lygaeid *Kleidocerys resedae* (Panzer) during his work on cattail insects, and it is unlikely he would have overlooked *C. typhae* in his thorough survey of *Typha*, which was conducted mainly in the Ithaca, New York area where this bug is now established.

Biological notes.—We observed *C. typhae* in the field and brought back cattail heads to the laboratory so that nymphs and adults could be extracted with a Berlese funnel. In early June we found adults and nymphs of all stages in heads of the previous season. The bugs were restricted to old heads fluffed out by the feeding of the cosmopterigid *Limnaecia phragmitella* Stainton (Fig. 2) (see Claassen, 1921). Four or five heads

collected in Schuylkill Co. on 6 June yielded 29 first, 27 second, 35 third, 67 fourth, and 28 fifth instars. Some old heads harbored several hundred adults and nymphs; cast skins often were conspicuous on heavily infested heads.

The ischnorhynchine *K. resedae* also was present in old heads taken in several cattail colonies and occasionally occurred in the same head with *C. typhae*. Three such heads contained 200 individuals of *C. typhae* and 107 of *K. resedae*. The latter species feeds on seeds of numerous plants, particularly birch, rhododendron and other ericaceous shrubs, and cattail (see Wheeler, 1976). The interaction and possible competition between these lygaeids of similar feeding habits (Sweet, 1960), although difficult to assess, seem worthy of study.

By mid-July to early August fewer old heads contained large numbers of adults; nymphs, nearly all late instars, became scarce. During this time adults were observed in newly formed staminate spikes where they usually were concealed beneath the stamens. The staminate or upper portion of the fruiting head is not persistent, the stamens soon being shed, and adults are more likely to be detected on the new pistillate spikes. Mating occurred on the surface, the pairs typically clustered near white fluffy patches that mark tunnels of *L. phragmitella* (Fig. 3). Adults push their stylets through the dense flowers; during feeding the body is elevated and the abdomen held nearly perpendicular to the surface, as noted by Cobben (1953). The bugs also use lepidopteran tunnels to burrow into the new fruiting spikes, which are composed of numerous, dense minute flowers. Thus, larvae of the Holarctic moth *L. phragmitella* are important to *C. typhae* for permitting access to the interior of hard newly formed heads, and also in spinning silk to hold the downy material together so that seeds are retained; uninfested heads lose their seeds during winter and spring (Claassen, 1921). Other Lepidoptera are known to develop in heads



Figs. 2, 3. Pistillate spikes of *Typha latifolia*. 2, Head of previous season fluffed out by the tunneling and feeding of larvae of the cosmopterygid *Limnaecia phragmitella*. 3, Current-season head with white, fluffy patches indicating new larval tunnels of *L. phragmitella*.

of *T. latifolia* in North America, but *L. phragmitella* "is the most common and the most abundant of the insects infesting the cat-tail" (Claassen, 1921). One even wonders whether *C. typhae* could have become established in North America in the absence of the cosmopterygid.

Chilacis typhae oviposits on the seed or pappus (Southwood and Leston, 1959). In early August we collected large numbers of nymphs in pistillate heads, mainly early instars of a presumed second generation. The heads contained adults, some of them teneral, or adults and fourth and fifth instars in late October and early November; adults only were present at one site sampled in early December.

Because we did not sample a cattail col-

ony at regular intervals throughout a season, our phenological profile of *C. typhae* in eastern North America is tentative. In England adults are known to overwinter, oviposition begins in late May or early June, and nymphs become adult by mid-July. There is a single annual generation, although in Central Europe a partial second generation may be produced in autumn, the nymphs overwintering (Southwood and Leston, 1959). The adults collected during early June in Pennsylvania may have been a combination of overwintered individuals and those of the season's first brood since fifth instars were present. Collection of all nymphal stages, especially early instars, from new pistillate spikes in late July–early August suggests the beginning of a second generation; and the



Fig. 4. Adult habitus of *Chilacis typhae*, dorsal aspect. Scale line = 1.0 mm.

presence of teneral adults and late instars in late October, the completion of a second brood.

This presumed bivoltinism, with adults overwintering and occurring throughout the summer, contrasts with the life cycle Jordan (1935) outlined for *C. typhae* in Germany. He emphasized that because this lygaeid depends on fruit-bearing stands of cattail, its

development takes place during the cold season. Copulation and some development occur in winter, and all nymphs become adult the following May. Only adults are found during summer when they are said to be inactive beneath cattails or rest on other marsh plants. In the Netherlands, however, Cobben (1953) reported that adults are abundant and mate during July and August.

Additional study is needed to determine whether North American populations are bivoltine and whether only adults survive the winter.

Recognition features.—The adult of *C. typhae* (Fig. 4) is 3.0 to 4.8 mm long, glabrous, shining yellowish brown or ochreous and strongly punctured above, with the head and thorax fuscous beneath. It is easily recognized by the juga that nearly attain the apex of the tylus, the latter extending beyond the apex of antennal segment I; the prominent fuscous grooves separating tylus from juga; the nearly trapezoidal pronotum with sublaminately produced edges; and the dark scutellum with a pale V-shaped mark.

Nymphs are a pale yellowish brown with orangeish or reddish markings (or sometimes transverse reddish bands) on the abdomen and have dorsal abdominal scent glands that open between tergites III–IV, IV–V, and V–VI; the anterior gland is reduced (Usinger, 1938). Péneau (1909) and Collett (1927) illustrated the fifth instar of *C. typhae*, and Jordan (1935) described four of the five nymphal stages; his (and Collett's) instar IV is actually V (Puchkov, 1958). For references to additional descriptions and illustrations of the immature stages of *C. typhae* the reader is referred to Slater's (1964) catalog. The nymph of *K. resedae* can be distinguished from that of *C. typhae* by the brown or almost fuscous head and pronotum and dark red or reddish-brown abdomen, and by the well-developed anterior scent gland.

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LITERATURE CITED

- Claassen, P. W. 1921. *Typha* insects: Their ecological relationships. Cornell Univ. Agric. Exp. Stn. Mem. 47. pp. 459–531.
- Cobben, R. H. 1953. Bemerkungen zur Lebensweise einiger holländischen Wanzen (Hemiptera-Heteroptera). Tijdschr. Entomol. 96: 169–198.
- Collett, H. R. P. 1927. The earlier stages of *Chilacis typhae* Perr. Entomol. Mon. Mag. 63: 155–157.
- Everett, T. H. 1982. The New York Botanical Garden illustrated encyclopedia of horticulture, Vol. 10, Ste-Zy. Garland Publishing, New York. pp. 3225–3601.
- Gleason, H. A. and A. Cronquist. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. D. Van Nostrand, Princeton, N.J. 810 pp.
- Jordan, K. H. C. 1935. Beitrag zur Lebensweise der Wanzen auf feuchten Böden. (Heteropt.). Stett. Entomol. Ztg. 96: 1–26.
- Péneau, J. 1909. Notules hémiptérologiques (3). I.—Sur la capture de *Chilacis Typhae* (Perris). Bull. Soc. Sci. Nat. Quest France (2) 9: 511–514.
- Puchkov, V. G. 1958. Larvae of Hemiptera-Heteroptera. I. Lygaeidae. Entomol. Rev. 37(2): 332–351.
- Slater, J. A. 1964. A Catalogue of the Lygaeidae of the World. 2 vols. Univ. of Connecticut. Storrs. 1668 pp.
- Slater, J. A. and H. Brailovsky. 1986. The first occurrence of the subfamily Artheneinae in the Western Hemisphere with the description of a new tribe (Hemiptera: Lygaeidae). J. N.Y. Entomol. Soc. 94: 409–415.
- Southwood, T. R. E. and D. Leston. 1959. Land and Water Bugs of the British Isles. Frederick Warne & Co., London. 436 pp.
- Sweet, M. H. 1960. The seed bugs: A contribution to the feeding habits of the Lygaeidae (Hemiptera: Heteroptera). Ann. Entomol. Soc. Am. 53: 317–321.
- Usinger, R. L. 1938. Dorsal abdominal scent glands in nymphs of Lygaeidae. Pan-Pac. Entomol. 14: 83.
- Wheeler, A. G., Jr. 1976. Life history of *Kleidocerys resedae* on European white birch and ericaceous shrubs. Ann. Entomol. Soc. Am. 69: 459–463.